

ROSAT GUEST OBSERVER PROGRAM DESCRIPTION

1. DESCRIPTION OF COOPERATIVE PROGRAM

This solicitation invites proposals for participation in the National Aeronautics and Space Administration (NASA) program to conduct astronomical observations and analyze data using the Röntgensatellit (*ROSAT*). *ROSAT* is a cooperative program in X-ray astronomy between Germany and the United States, and between Germany and the United Kingdom. Under the agreement between NASA and the German Federal Ministry for Research and Technology (DLR), Germany provided a spacecraft with a 0.8 meter diameter X-ray telescope and two identical position sensitive proportional counters (PSPC) mounted in the focal plane of the telescope. NASA provided a high resolution imager (HRI) mounted in the focal plane of the telescope and launched the *ROSAT*. Announcements for the *ROSAT* observing program similar to this one are being issued in Germany by DLR and in the United Kingdom by the British Science and Engineering Research Council (SERC).

2. STRENGTHS OF THE ROSAT PROGRAM

The HRI is the only focal plane instrument available for pointed observations. The HRI's unique strengths and merits in X-ray astronomy are for high spatial resolution, low-background, soft X-ray imaging, and for the study of the structure of diffuse or low surface brightness features. The large amount of time available exclusively for wide-field, high resolution X-ray imaging studies in this HRI-only mission phase makes this opportunity unique. Therefore, observers are encouraged to consider proposing large programs, such as a very deep observation, mapping modest sized structures, or a series of medium depth observations of a sample of objects. While no fraction of the observing time has been specifically earmarked for large projects and proposals for large programs are subject to the same rules and restrictions as all others, it is expected that it will be possible to select one or more such programs.

3. MISSION DESCRIPTION

The *ROSAT* X-ray telescope consists of four concentric Wolter type-I grazing incidence mirror pairs. The outer mirror has an aperture of 84 cm and a focal length of 240 cm. The unobscured collecting area is 1141 cm². The energy response extends from 0.1 to 2.4 keV, and the on-axis angular resolution is better than 5 arc seconds. The focal plane assembly consists of a carousel carrying 3 imaging X-ray detectors; only one instrument can occupy the focal point at any one time. The HRI is a copy of the high resolution imager flown on the second High Energy Astronomy Observatory (HEAO-2, a.k.a. *Einstein*) spacecraft, but with increased quantum efficiency. It is a two-dimensional microchannel plate-based instrument which has a spatial resolution of better than 5 arc seconds, a temporal resolution of 62 micro-seconds, and a field of

view of 36 arc minutes. The HRI has an energy response extending from 0.2 keV to beyond the cutoff in the mirror response at about 2.4 keV. The effective area of the HRI is 45 cm² near 0.28 keV and 95 cm² near 1 keV. It has essentially no energy resolution. All *ROSAT* observations will be preplanned. No real-time operations will be available. A detailed description of the *ROSAT* spacecraft, the scientific instruments and their sensitivities, and spacecraft operations are contained in the "The *ROSAT* High Resolution Imager (HRI) Calibration Report," which can be obtained from the anonymous FTP account <legacy.gsfc.nasa.gov>, in the directory <rosat/nra_info/>. A printed version can be mailed, if necessary; see addresses on page 3 of the Announcement.

ROSAT also carries an independent wide-field extreme ultraviolet camera (WFC) provided by the British Science and Engineering Research Council (SERC). Observations with the WFC are not included in the agreement between DLR and NASA. Therefore, proposals to make observations with the WFC are not solicited under this Announcement.

ROSAT was launched from the NASA Kennedy Space Center on June 1, 1990, into an orbit of 53° inclination and 580 km altitude. After a 2-month check-out phase, 6 months were devoted to an all-sky survey. The initial episode of pointed observations of specific X-ray targets began on February 7, 1991. This Announcement solicits proposals for pointed observations during the next 1-year episode of pointed observations, beginning in November 1998.

During the pointed phase, NASA receives 50 percent of the telescope time, now exclusively using the HRI in the focal plane. The entire U.S. share of the observing time is made available competitively to guest observers. That is, there are no principal investigator rights to the U.S. *ROSAT* data. A joint NASA/DLR/SERC *ROSAT* International Users' Committee (IUC) has been established to coordinate the observing program and to eliminate unwarranted duplication of observations.

4. DATA PROCESSING AND ANALYSIS

Data from *ROSAT* are recorded on board the spacecraft and transmitted to the German Space Operations Center (GSOC) ground station near Weilheim, Germany. Initial processing of the data is performed at the GSOC, Oberpfaffenhofen, Germany, and at the German *ROSAT* Science Data Center located at the Max Planck Institute for Extraterrestrial Physics (MPE), Garching, Germany (referred to as Level 0 processing). Following initial processing, the data are shipped to the U.S. *ROSAT* Science Data Center located at the NASA Goddard Space Flight Center (GSFC), Greenbelt, Maryland, for further reduction (Level 1) via the Standard Analysis Software System (SASS), and distribution of U.S. data to investigators selected as a part of the U.S. *ROSAT* program. German and British owned data are processed and distributed through *ROSAT* data centers in their respective countries.

The processing of the U.S. data at GSFC is carried out with the assistance of the Smithsonian Astrophysical Observatory (SAO), Cambridge, Massachusetts. The SAO/GSFC team has developed interactive analysis routines (Level 2) that are available to interested astronomers. These routines have been developed under the Image Reduction and Analysis Facility (IRAF) executive and as part of the GSFC FTOOLS package. Further information regarding the software packages can be found through the U.S. *ROSAT* Guest Observer Facility page on the

World Wide Web at <<http://heasarc.gsfc.nasa.gov/docs/rosat/roskof.html>>.

5. FUNDING

No funding will be provided directly through this Announcement, which is only for the provision of *ROSAT* observing time and the subsequent acquisition of data. As noted in the cover letter, observers with proposals selected through this Announcement may submit a proposal for funding as part of the NASA Astrophysics Data Program (ADP), a formal announcement for which will be released in early 1999.

ADDITIONAL INFORMATION REGARDING PROPOSAL PREPARATION, SUBMISSION, AND SELECTION

1. REQUIREMENTS AND CONSTRAINTS

This Announcement is the ninth to invite proposals to use the *ROSAT* X-ray observatory. This Announcement covers the 1-year period of observations beginning about November 10, 1998.

Since September 1994, the PSPC gas supply has been effectively exhausted. Thus, only the HRI will be available for observations. This “HRI only” mission phase provides observers with an unprecedented opportunity for performing detailed, extensive high resolution X-ray imaging studies. As part of the *ROSAT* Guest Observer program since “AO5” (whose observations began in mid-1994), observers have been encouraged to propose large programs to fully utilize this capability. A number of these have been accepted either in full or in part, and some of these received additional time in subsequent observing cycles. While a balance between large, medium, and small observing programs is still sought, the trend toward large observing programs is encouraged.

Any additional announcement will be released at least one year from now. On the other hand, given the limited funds available in all three participating nations for extended mission operations, coupled with the impending launch of *AXAF*, it is possible that “AO9” will be the final solicitation for participation in the *ROSAT* Guest Observer program. In order to make the best use of what might be the final year of *ROSAT* observations, the peer review panels will be instructed to place priority on those missing observations that will represent an essential element in the *ROSAT* archive, and on the completion of the high priority large programs currently underway.

ROSAT is an international X-ray astronomy observatory. The three participants, Germany, the U.S., and the U.K., have agreed to make *ROSAT* observing time available to the international astronomical community. Proposals may be submitted to any one of the three national programs (German, U.S., and U.K.), but proposers should note the following agreements regarding proposal submission:

- A proposal must be submitted to only one national program. The appropriate national program to submit a proposal will be determined solely by the nationality of the sponsoring institution with which the proposer is affiliated, either permanently or on a long-term visit that extends for at least the duration of the guest investigation. Proposers for observing time from Germany, the U.S., or the U.K. must submit proposals only to their respective national programs.
- A proposer from other than Germany, the U.S., or the U.K. may submit his or her proposals to any one of the three national programs, but only to one. The observing time allocated to a

proposer will, therefore, be charged to only one national program.

- Similar proposals with similar target lists should NOT be submitted to more than one national program if essentially the same consortium of investigators is implicitly involved. A consortium of investigators may choose to split up a large survey investigation into different proposals submitted to different national programs, but the target lists should also be different. Each of the individual proposals will be evaluated on its own merit.

2. SUPPLEMENTARY INFORMATION

Additional information which might be of assistance in preparing proposals are available electronically and/or in hard copy form. The most relevant information and the most up-to-date proposal preparation utilities are most easily accessed through the World Wide Web. The U.S. *ROSAT* Guest Observer Facility Web page can be found at:

<<http://heasarc.gsfc.nasa.gov/docs/rosat/rosgof.html>>.

Retrieval of documents via ftp is possible through the Web, or directly from the *ROSAT* directory on the anonymous ftp account at <legacy.gsfc.nasa.gov>.

Listed below are the most useful documents and utilities, and the specific ftp location from which the documents can be retrieved:

ROSAT Mission Description: This document was the “Appendix F” of the first several NASA Research Announcements for the *ROSAT* guest observer program. It contains useful background information about the satellite and instruments not available elsewhere in a condensed form. It is available for viewing through the WWW page and for ftp transfer.

ROSAT HRI Calibration Report: This document provides a detailed description of the *ROSAT* spacecraft, the scientific instruments and their sensitivities, and spacecraft operations. It is available through the ftp account.

ROSAT User’s Handbook (RUH): A detailed description of all facets of *ROSAT*: mission, satellite, instruments, and calibration. It is accessible both through the WWW and the ftp account.

ROSAT Observation Log: As complete and up-to-date listing as possible of all *ROSAT* observations that either have been performed, scheduled, or accepted. An ASCII version is accessible through the ftp account, and the most up-to-date version is accessible through the WWW.

OGIP mission planning tools: These facilitate calculation of key information for proposals. Access to them is described in Appendix E. Utilities include:

PIMMS (Portable Interactive Multi-Mission Software) - Allows prediction of the HRI count rate for a source, given a spectrum and either a flux or a count rate from another mission.

VIEWING - determines dates during which specified celestial coordinates are available for observation by *ROSAT* (and other missions).

COCO - facilitates conversion between equatorial, ecliptic, and galactic coordinates, as well as coordinate precession.

User's Guides are available through the WWW and ftp.

PROS User's Guide: Complete instructions for the use of the IRAF-based Post-Reduction Off-Line Software, developed for analysis of *ROSAT* data. Available via the WWW and through the ftp account. More direct ftp access to the document is through <[sao-ftp.harvard.edu](ftp://sao-ftp.harvard.edu)>.

ROSAT data analysis using xselect and ftools: Manual for using ftools and associated scripts for analyzing *ROSAT* data. Available tools largely complement those in PROS. It is accessible through ftp and the WWW.

A limited number of printed versions of these documents is available by request to the address below. These requests for supplementary information should contain the name, full mailing address, and telephone number of the potential proposer.

Office of Guest Investigator Programs
Code 660.2
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
USA
Telephone: (301) 286-2291
E-mail: <arida@milkyway.gsfc.nasa.gov>

Technical questions concerning the *ROSAT* mission and requests for assistance in proposal submission may be addressed to Dr. Robert Petre, U.S. *ROSAT* Project Scientist, at:

Dr. Robert Petre
ROSAT Science Data Center
Code 662
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
USA
Telephone: (301) 286-3844
FAX: (301) 286-1684
E-mail: <rob@hatrack.gsfc.nasa.gov>

3. PROPOSAL FORMAT, CONTENT, QUANTITY, AND ELECTRONIC SUBMISSION

Only electronic versions of proposals will be accepted for this cycle. No paper copies are required. Proposal text and images of the forms can be submitted using either anonymous ftp or the WWW, as described in Appendix D.

In addition, the information contained on the proposal forms, copies of which are displayed in Appendix C, must be submitted via Remote Proposal Submission (RPS). A description of the use of RPS is also found in Appendix D. Two versions of RPS exist: an automated E-mail submission system and a World Wide Web form-based system. Both versions offer a “user friendly” means of entering, checking, electronically submitting, and printing the forms. RPS access is described in Appendix D. Any proposer without access to the Internet should contact Dr. Robert Petre, U.S. *ROSAT* Project Scientist, at the address given above at least two weeks prior to the proposal due date.

The proposal must include the scientific justification, as described below, a standard Cover Page, a General Form, a Target Summary form, and, where appropriate, Target Constraints and Target Remarks forms. Submission of proposal forms signed by an institutional official is not required. If the proposer’s institution requires submission of such forms, then one signed copy should be sent to Dr. Petre at the mailing address in Appendix A.

NASA, DLR, and SERC have agreed that up to 5 percent of the *ROSAT* observing time can be allocated to time constrained observations (i.e., time-critical as defined in Appendix E). For constrained observations, a Target Constraints form must be submitted; one should not be submitted otherwise.

Proposers should also note that the pointing positions given in the Target Summary form will be used to point the spacecraft and that care must be exercised in stating these positions. Slight pointing errors can seriously degrade the data from an observation. Positions must be stated in equinox/epoch 2000. For proposals involving multiple pointings, targets should be ordered on the Target Summary form in the order of preference. The peer review panels are instructed to preserve the highest priority observations when reducing the time requested in a proposal.

Because of the large number of proposals anticipated in response to this Announcement, strict page limits will be applied to all proposals. The scientific justification should consist of not more than four pages, of which a maximum of three may be devoted to justification text. Type should not be smaller than 10 point (standard typewriter size print). These four pages and the Target Summary, Target Constraints, and Target Remarks forms comprise the scientific proposal and should provide the U.S. reviewers and the IUC with the essence of the scientific proposal.

The scientific justification must provide the following information and is to be structured as follows:

(1) Scientific Problem:

State clearly the scientific problem to be addressed, along with relevant scientific background and references to previous work. Show how the proposed *ROSAT* observations and data analysis techniques are expected to address the problem and advance previously obtained knowledge, mentioning past work in this research area. Justify how the observations use the strengths and unique capabilities of the *ROSAT* HRI. Note that a strong justification must be provided for the observation of targets already observed or approved from previous *ROSAT* Announcements (suggested maximum text length: 2 pages).

(2) Technical Feasibility:

State how the proposed *ROSAT* exposure time makes possible the fulfillment of the scientific objectives. State how targets or pointing locations were selected. A clear listing should be provided of the assumptions about source intensity, surface brightness, and/or spectrum (depending on the nature of the proposed investigation). Estimates of both count rates and total counts needed to carry out the investigation should be provided. Note that it is in the proposer's best interest to provide enough detail to allow a reviewer to understand the proposer's target brightness assumptions and to reproduce estimates for counting rates and minimum observing times (suggested text length: 1/2 page).

(3) Previous *ROSAT* Observations:

List all *ROSAT* pointed observations, regardless of principal investigator, that have already been performed, are scheduled, or are awaiting scheduling that are directly relevant to this proposal (suggested text length: 1/2 page).

A summary of what should be included as part of a proposal is listed below:

Section	Page Limit	Comments
Cover Page	1	No other cover necessary.
General Form	1	Institutional signature required.
Target Summary	1 or more	As needed
Target Constraints	1 or more	Optional
Target Remarks	1 or more	Optional
Scientific Justification and Technical Feasibility	4	Includes text, figures, charts, and tables
Vitae of Key Investigator	1	Optional

Reviewers will base their assessment only on the portion of each proposal that complies with the page limits.

To facilitate the recycling of proposals after review, proposals should be submitted on plain, white paper only, including all budget sheets and certifications. This precludes the use of cardboard stock, plastic covers, colored paper, etc. Proposals which do not meet these requirements will be returned unread to the submitting institution.

Fifteen copies of the proposal, including a signed original, should be sent to the following address:

ROSAT Guest Observer Program
Code 662
Building 2, Rm. 250
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
USA

4. PROPOSAL EVALUATION, SELECTION, AND IMPLEMENTATION

A. Evaluation Criteria

The criteria given in this paragraph apply only to the evaluation of proposals submitted in response to this Announcement. The criteria below are shown in descending order of priority.

1. The overall scientific merit of the investigation.
2. The relevance of the proposed research to NASA's Space Science programs.
3. The suitability of using the *ROSAT* observatory and data products for the proposed investigation, the degree to which the investigation uses *ROSAT*'s unique capabilities, the feasibility of accomplishing the objectives of the investigation within the time proposed, and the feasibility of the analysis techniques.
4. The competence and relevant experience of the principal investigator and any collaborators as an indication of their ability to carry the investigation to a successful conclusion within the requested resources, including the timely publication of refereed scientific journal papers.

B. Proposal Evaluation and Selection

ROSAT observation proposals will be evaluated in a two stage process: a scientific and technical review by NASA and a review by the *ROSAT* International Users Committee (IUC) to eliminate unwarranted duplication.

The goal of the national proposal reviews, and subsequently the IUC, is to produce a list of *ROSAT* targets that is sufficiently oversubscribed to allow the most efficient utilization of the satellite. To that end, the total amount of observing time needed to complete the final international *ROSAT* program is 50 percent longer than the time available (i.e., 50 percent over subscription). The NASA proposal review and the other national reviews over subscribe their respective time allotments by 70 percent in anticipation of the time reduction that occurs when target overlaps are eliminated by the IUC.

All proposals submitted in response to this Announcement will be reviewed for scientific merit, for technical feasibility, and for duplication with observations proposed to the DLR and SERC. The proposal review process will be directed by the cognizant discipline scientist at the Office of Space Science, NASA Headquarters. However, proposals will first be reviewed for technical feasibility by U.S. *ROSAT* Science Data Center staff. This consists both of an evaluation for technical feasibility within spacecraft constraints and feasibility within observational constraints.

Following the technical review, a scientific peer review panel will evaluate the proposals in accordance with the criteria given above. Proposed observations will be placed into one of four categories. Highest priority observations that use a total of approximately two-sevenths of the U.S. observing time will be placed in category A. Medium priority observations that use a total of approximately two-sevenths of the U.S. observing time will be placed in category B. The remaining recommended observations, using up to three-sevenths of the U.S. observing time, will be placed in category C. Observations that do not justify further consideration for *ROSAT* will be rejected (i.e., placed in category D). A proposal containing multiple observations may

have any combination of priorities assigned to the observations.

The list of acceptable U.S. targets will be submitted to the IUC together with target lists from DLR and SERC for resolution of conflicting observations and for prioritization for observation scheduling. Conflicts between observations will first be resolved on the basis of the priority assigned by the national review panels. If conflicts cannot be resolved on the basis of national priority or scientific merit, the IUC will use factors other than scientific merit to resolve the conflict.

C. Implementation

Based on the category assignments by the national committees and the resolution between conflicting observations, the IUC will assign one of three observational priorities to each proposed observation. These priorities will be given to DLR to formulate the *ROSAT* Long-term Mission Time Line (LTL) for the eighth round of pointed observations. Priority 1 is for time constrained observations (less than 5 percent of the observing time), Priority 2 is for all other category A and B observations, and Priority 3 is for all category C observations. All selected targets with Priorities 1 and 2 are guaranteed observation time. That is, if it is not possible to accommodate an approved Priority 1 or 2 observation in a given observing period, it will be scheduled during the next observational period (provided there is one). DLR and GSOC will schedule as many Priority 3 observations in the LTL as possible, but a Priority 3 target has no guarantee of receiving observation time even if it appears in the LTL, and the proposer should be prepared to propose again if there is a subsequent *ROSAT* observing cycle. This process will result in a reduction of observing time commitments to 100 percent of the national allocations.

Completion criteria differ for the three priority classes. While every attempt is made to observe Priority 1 targets for their full requested time, they are difficult to schedule and implement as a result of their constrained nature. Thus, Priority 1 targets are only performed on a best effort basis. Priority 2 targets, which constitute the bulk of the observing time, are considered complete only if the amount of useful exposure time exceeds 70 percent of the requested time. Priority 3 targets, treated as “filler” in observation scheduling, are also treated on a “best effort” basis.

5. GUIDELINES FOR NON-U.S. PARTICIPATION

NASA welcomes proposals from outside the U.S. However, investigators working outside the U.S. are not eligible for funding from NASA. Proposals from non-U.S. entities should not include a cost plan. Proposals from outside the U.S. and U.S. proposals that include non-U.S. participation, must be endorsed by the respective government agency or funding/sponsoring institution in that country from which the non-U. S. participant is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

One paper copy of the proposal, along with a Letter of Endorsement from the sponsoring non-U.S. agency, must be forwarded to:

Ms. Bettye Jones

(AN 98-OSS-01)
Space Science and Aeronautics Division
Code IS
National Aeronautics and Space Administration
Washington, DC 20546-0001
USA

All proposals must be written in English. All non-U.S. proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date; those received after the closing date will be held for the next proposal cycle. Sponsoring non-U.S. agencies may, in exceptional situations, forward a proposal without endorsement to the above address if endorsement is not possible before the announced closing date. In such cases, however, NASA's International Science and Aeronautics Division should be advised when a decision on endorsement can be expected.

Successful and unsuccessful proposers will be contacted directly by the NASA Research Program Management Division. Copies of these letters will be sent to the sponsoring government agency. Should a non-U.S. proposal or a U.S. proposal with non-U.S. participation be selected, NASA's International Science and Aeronautics Division will arrange with the non-U.S. sponsoring agency for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency will each bear the cost of discharging their respective responsibilities. Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

1. a letter of notification by NASA; and
 2. an exchange of letters between NASA and the sponsoring governmental agency,
- or
3. a formal Agency-to-Agency Memorandum of Understanding (MOU)

PROPOSAL FORMS

This appendix includes the forms that should be used for preparing proposals in response to this Announcement. If additional copies of the forms are needed, photocopies may be made.

List of forms:

- Cover Page
- General Form
- Target Summary form
- Target Constraints form
- Target Remarks form

The various forms included in this Appendix can be removed and copied as needed. Each proposal must include all forms as summarized in the table in Appendix B, Section 3.

1. COVER PAGE

Each proposal must be accompanied by a completed Cover Page. The cover page includes the Principal Investigator information, the Proposal Title, and Abstract of the proposed investigation.

NOTE: Use only this cover page. **Do not use** your Institution/Corporation's cover page.

2. GENERAL FORM

The General Form contains information concerning collaborators, co-investigators, and administrative information, including the institutional endorsement.

3. TARGET SUMMARY FORM

The Target Summary form contains each target being proposed for the program of observations.

4. TARGET CONSTRAINTS FORM

The Target Constraints form is an optional form, to be submitted only when requesting time-critical observations as described in Appendix E.

5. TARGET REMARKS FORM

The Target Remarks form is an optional form, to be submitted only when special comments are required to describe observations.

ELECTRONIC PROPOSAL SUBMISSION AND PROPOSAL PREPARATION TOOLS

Three steps are involved in electronic submission, as described below:

- a. Submission of the content of the proposal forms via RPS (performed in the same way as for past proposal cycles).
- b. Retrieval of a proposal submission number from the RPS receipt message.
- c. Electronic transfer of the proposal text and forms as PostScript files with file names constructed in the required fashion.

1. FORM CONTENT SUBMISSION VIA RPS

Two versions of RPS exist: an automated E-mail submission system and a World Wide Web (WWW) form-based system. Both are described briefly below.

The automated E-mail system is an E-mail server that uses a few basic commands to process a user's request. The user starts the process by submitting a blank E-mail request to <rps@legacy.gsfc.nasa.gov>. The blank request returns the help page that contains instructions and examples to obtain the blank forms, to submit the final electronic version, etc. The blank form is ASCII text, so any text editor may be used to enter values. The entries are name:value entries; the order of the text is immaterial. Once the form has been edited, it may be remailed to the above E-mail address. Verification is the default option (not submission). Some range checking is done and errors are flagged for the user. Other options include "submit," which submits the form for verification and, if no errors are found, sends the form to the proposal database and "latex," which returns a LaTeX version of the form.

The user should be aware that there have been occasional long lags between the time a request is submitted for processing and the time the processed request is returned to the user due to a network traffic problem. If that occurs, however, please report the details of who, what, when, where, etc., to <rps@athena.gsfc.nasa.gov>.

The second RPS tool is the WWW form. WWW is a stateless server, so it functions in a manner similar to that of the automated E-mail server. The user must always "submit" an action to the server to obtain or to update a result. The overall appearance of the form is similar to the paper forms. This appearance was retained largely for convenience, although the layout of the form may evolve with use over upcoming proposal periods. On-line help is available as with most Web applications.

The URL is:

<<http://legacy.gsfc.nasa.gov/cgi-bin/RPS/ROSAT/RPS.pl>>.

2. ELECTRONIC SUBMISSION OF PROPOSAL TEXT AND FORM FILES

Proposals must be submitted electronically. Two separate PostScript files are to be submitted: one containing the RPS forms, and another containing the complete proposal text. Note that the submission of the PostScript files containing the forms is in addition to the submission of their contents via RPS.

Both the forms and the proposal text must each be submitted as a PostScript file. Proposers are asked to keep this PostScript file containing the proposal text as generic as possible, e.g. do not use exotic fonts that may not exist on all platforms. We will also accept compressed PostScript files, as long as a widely available compression scheme has been used (e.g., gzip or pkzip). We offer two routes for electronic file transfer, FTP and a Web interface accessible through RPS. Below, we describe the procedure involved in using these two options.

When the contents of the proposal forms are submitted via RPS through either the email or the Web interface, a proposal submission number will be assigned to that proposal. This number will be reported back to the submitter either via email, for email submissions, or in the "successful submission" message returned through the Web interface. This number is very important, as it will be used to connect subsequent scientific justification and form uploads with their respective data base entries. Once you have submitted a proposal, noting the proposal number, and have PostScript versions of the proposal forms and the scientific justification you may then:

FTP

- a.) FTP anonymously to <lheaftp.gsfc.nasa.gov>.
- b.) Change your mode to binary if uploading a compressed file.
- c.) Change directories to /pub/rps/ROSAT/ Note that files in this directory are protected from reading by unauthorized users.
- d.) "put" your two files in this directory. We require that the uploaded filename you follow a prescribed format. The scientific justification's file name should consist of a concatenation of a three digit proposal submission number, the PI's first initial, the PI's last name, "_sj.ps," and the appropriate suffix for the type of file being uploaded. So, if a scientific justification is being uploaded as a gzipped PostScript file with Jane Doe as the PI, and a proposal submission number with the value 47, then the "put" command line would be:

put localfilename 047_jdoe_sj.ps.gz

The PostScript form name should be similar, but with "f" being used in place of "sj," i.e., 047_jdoe_f.ps.gz. Please note that for proposals with submission numbers less than 100, the numeric field should be padded with 0's to the left.

If you are resubmitting a scientific justification or form then you cannot use just the proposal submission number. Follow the proposal number with a letter indicating which resubmission this is, e.g. "b" for the second, "c" for the third, etc. Therefore, a resubmission of the previous example would be:

```
put localfilename 047b_jdoe_sj.ps.gz
```

```
put localfilename 047b_jdoe_f.ps.gz
```

After you have uploaded the files, you will not be able to execute a directory command to see that your or anyone else's files are there.

e.) Quit.

f.) Within 2 working days you will be notified if the scientific justification was indeed received and readable. If no notification is received, email should be sent to <rpshep@athena.gsfc.nasa.gov>.

WWW Interface

Note, this is available for users of Netscape 2.0 and higher; but not Internet Explorer. There will be an "upload" button on the RPS form input page. This button will take you to a form that will allow you to upload the scientific justification and/or PostScript version of the form. It is easiest to do this immediately after submitting the contents of the forms. By doing it at this time, all of the pertinent values, except for the local filenames, will be filled in by RPS. However, you can go to this form at some other time AFTER successfully submitting a proposal. You have to have a proposal number before you can upload your files. On the upload form you will have to fill in the following fields, unless you have just successfully submitted a proposal:

PI last name, PI first initial, proposal number, and mission (all capital letters)

You will always have to fill in the names of the local files that you wish to upload. This can also be accomplished by using the "browse" button next to the file fields to see a list of your local files from which to choose. Once all the fields are filled out, hit the "submit" button. This should upload your files. Assuming you get no error messages in return, a PI should expect to receive an email confirming that the files have been received and are readable within two working days. If the PI does not receive a confirmation email they should send email to <rpshep@athena.gsfc.nasa.gov>.

3. PROPOSAL PREPARATION TOOLS

The following tools are available to help write proposals:

VIEWING: This program allows calculation of the viewing window for a specified target position. The window is given within the 366 days from the date the program is run. The coordinates are assumed to be epoch 2000. The software and installation instructions can be obtained from the legacy anonymous ftp account, under:

```
/rosat/nra_info/viewing/
```

When running this as a stand alone program, please invoke with:

```
>viewing mission=rosat
```

to pick up the *ROSAT* sun angle constraints (ASCA is the default).

The program can also be invoked from the *ROSAT* GOF world wide web page. The URL is:

<<http://heasarc.gsfc.nasa.gov/Tools/Viewing.html>>.

Use the pull-down menu to select the *ROSAT* mission.

COCO: This allows conversions between equatorial, galactic, and ecliptic coordinates, and includes the capability for precessing coordinates. COCO can be run from the World Wide Web; the URL is:

<<http://heasarc.gsfc.nasa.gov/cgi-bin/Tools/convcoord/convcoord.pl>>.

PIMMS: This tool allows estimation of *ROSAT* HRI count rates. PIMMS can be run from the World Wide Web; the URL is:

<<http://heasarc.gsfc.nasa.gov/Tools/w3pimms.html>>.

In addition, the PIMMS software and users guide can be obtained from the ftp area under:

[/rosat/nra_info/pimms/](#)

PIMMS can be used for *ROSAT* count rate simulations using “instrument rosat hri.”

Worked *ROSAT* Examples, plus the HTML Users Guide are available on the web under:

<http://heasarc.gsfc.nasa.gov/docs/rosat/pimms_rosat_example.html>

and

<<http://heasarc.gsfc.nasa.gov/docs/rosat/pimms/pimms.html>>

respectively.

PIMMS is also available through the HEASARC user service account (“xray”) on <legacy.gsfc.nasa.gov>. Simply type “pimms” at the “HEASRC>” prompt.

NH: This tool returns the value of the integrated neutral hydrogen column density from any set of celestial coordinates. NH can be run from the World Wide Web; the URL is:

<<http://heasarc.gsfc.nasa.gov/cgi-bin/Tools/w3nh/w3nh.csh>>.

GUIDE TO SPECIFYING TIME CONSTRAINED OBSERVATIONS

The *ROSAT* program makes available approximately 5 percent of the observing time for so-called time constrained observations. The definition of a constrained observation in the case of *ROSAT* is quite inclusive: an observation is constrained if the observer provides *any* input to the scheduling beyond the satellite-imposed observing window.

The scheduling of *ROSAT* observations is performed in six-month blocks, which yields the Long-term Timelines (LTL's). Prior to implementation, weekly segments of an LTL are adjusted to compensate for changes in the satellite orbit. The product of these adjustments is the Short-term Timeline (STL). While new targets might appear or some targets lose observing intervals in the STL when compared with the LTL, this is largely done without human intervention. The only times the STL is adjusted by hand are to implement a Target of Opportunity Observation (TOO) or to adjust the scheduling of a constrained observation. Even so, many time constrained observations, especially those with extremely tight constraints, do not yield the time coverage requested. The proposer must keep this in mind when developing a strategy for a highly constrained observation.

A recent factor which has led to failure of constrained observations is the more highly constrained satellite attitude control software which has been introduced to compensate for onboard hardware failures. Currently, target acquisition must take place during orbit day. This again affects observing windows for all observations, but especially those that are highly constrained. An analysis of the *ROSAT* pointing history since the installation of the new software reveals that the maximum amount of observation time per day on a typical source is about **12 ks** (which translates to a maximum time within an observation window of ~300 ks). This number should be kept in mind when specifying monitoring or coordinated observations, or when requesting long pointings. The proposer must keep in mind that constrained observations are carried out on a best effort basis, and failures are common.

The *ROSAT* constraints form allows four types of constrained observations: monitoring, phase critical, coordinated, and contiguous. Only one of these is to be specified. This naturally leads to problems, as multiple constraints often apply. Below is offered some pragmatic advice about using these specifications, based on what has worked in the past.

Monitoring observations: These are the most common type of constrained observation, and one of the easier types to schedule. The purpose of such observations is to visit some source on a regular basis to detect flux variability. Monitoring observations are carried out at approximately regular intervals, as the orbital visibility allows. Observers should not expect exact repetition of spacing between observations. As a practical matter, monitoring observations should not request individual segments of more than about 5 ks or spacings less than a day. Otherwise, the observation might be more successfully scheduled as a coordinated observation.

Observers should be sure to specify the total observing time (i.e., the sum of all the monitoring intervals) on the target form.

Monitoring at six month intervals: It used to be the case that all segments of a monitoring observation are scheduled during a single six-month observing season, and that two observations of a single source scheduled six months apart did not constitute a time-critical observation. Due to the new acquisition constraints on the satellite, we have not been able to guarantee coverage of any source at six month intervals. **Thus, observations of the same source six months apart (i.e., in different observing seasons), must henceforth be specified as time critical.** These should be specified as “coordinated” (see below). The target should be listed twice on the target form (two separate observations), with the desired time for each semiannual pointing, and a statement on the remarks form and in the proposal text that the source should be observed once every six months.

Coordinated observations: This serves as the “catch-all” class of constrained observation, and the type most likely to be performed successfully. The satellite begins observing the specified source as close in time as possible to the specified start time, and observes it as long as it is visible until the requested observing time has elapsed. The only time the satellite is not observing the source is when it becomes occulted by the Earth. A coordinated observation of 40 ks duration will result in an intensive monitoring of the source for about one day.

While the name suggests its use for ensuring *ROSAT* scheduling opposite an observation using another observatory, a coordinated observation should be specified any time an exact start time and duration are required. This specification should also be used if intensive coverage is required over a short duration. It is preferred over the use of phase critical observations to observe short period binary systems; coverage of multiple orbits will likely produce coverage of the phases of interest. In these circumstances, the proposer may have no preference of a start date. It is best to indicate as the start date one or two days after the opening of the visibility window, and adding a remark that this is a “dummy” date.

Phase-critical observations: As the name suggests, these are tightly specified observations, to be used to observe a specific orbital phase of a source. No preference is to be placed on the exact observation date (otherwise, the observation should be specified as coordinated). If the same phase is to be observed multiply, then multiple observations can be specified (by indicating the number of observations on the target page). If multiple phases are to be observed, then multiple listings of the same target should be included on the target form, one per phase. In this case, observers should be sure to specify the total observing time (i.e., the sum of all the monitoring intervals) on the target form. On the other hand, it might be more prudent, and more likely to yield a successful observation, if a series of coordinated observations is specified. In order to ensure accurate phase coverage, the epoch should be as close to the observation start time as possible. Note that observation durations exceeding 1,500 seconds are likely to be split up into multiple intervals, possibly affecting observation of highly time-critical phenomena such as eclipse ingress.

These observations have produced the most severe scheduling problems and the most failed observations among the constrained observations. If it is possible to precisely specify a series of phases of interest, then a series of coordinated observations might lead to more success. If a

particular phase is of interest, is it wise to attempt to observe it more than once, in order to increase the likelihood of success.

Contiguous observations: Observers, in general, want the number of intervals in which their observations are split to be small. For certain timing applications, it is essential that this number be kept as low as possible. In these cases, one can request contiguous observations. The scheduling software then attempts to find a time when the source is visible for the longest time per orbit.

Very few contiguous observations have ever been scheduled, and it is unclear how successful the scheduling of this type of observation would be with the new scheduling constraints. Maximum coverage is better achieved with a coordinated observation.

Target of Opportunity Observations (TOO's): TOO's are *not* solicited as part of the proposal process. It is rare for *ROSAT* to perform such an observation, and there must be a compelling scientific reason for the regular observing schedule to be interrupted in favor of a TOO. Given the lead time for preparing and implementing a TOO, an observation usually is carried out between 10 and 14 days after the request has been accepted.

Requests for TOO's should be sent to the *ROSAT* Project Scientist, Prof. J. Trümper, at MPE (<jtrumper@rosat.mpe-garching.mpg.de>). He has sole responsibility for determining whether such an observation should be scheduled. In the case of multiple requests to observe the same object, Prof. Trümper also determines who constitutes the team responsible for analysis of the data.

It has been our experience that most constraint forms are filled out incorrectly. This forces the planning team to spend considerable effort attempting to understand what exactly the observer wants to do. Every effort is made to match the scheduling to the observer's scientific goals, rather than honor (often incorrect) observation specifications. Proposers should keep this in mind. **In particular, proposers should explain clearly and succinctly in the feasibility text how they would like the observation to be performed.** That will help the planning team immensely in its attempts to honor the observer's preferences.

There is a second reason proposers should exercise care in specifying how they would like a constrained observation to be performed. An incorrectly specified constrained observation will be flagged as part of the technical evaluation process, and can be used as reason to reject a proposal. Questions about how to specify a constrained observation should be directed to the ROSAT Guest Observer Facility.